the rate of admission of oxygen or air, too large a quantity, as well as too small a quantity, checking the oxidising action. He throws but little light upon the part played by the pyrites in the coal, a problem that has not yet been fully solved, but considers that the oxygen is mainly absorbed by the resins and the humus bodies present in the coal.

With respect to the storing of coal, he finds that any coal can safely be stored under water; lump bituminous coal, from which slack and dust have been screened out, can usually be stored with little or no danger; coal stored in the winter is less likely to give trouble than if stored in the summer, and in the latter case it is best if cool or cloudy days are selected; shallow piles are less likely to give trouble than deep ones; some coals, particularly those high in sulphur, undoubtedly heat more readily when damp; the ventilation of coal piles by means of perforated pipes or otherwise is very advisable; and, finally, a coal storage pile should be carefully watched, particularly for the first few weeks after it has been built.

The report is worthy of careful study, and forms a notable contribution to a subject of the greatest importance to coal producers and coal users alike, and at least as much so in this country as elsewhere.

It is significant of the British attitude towards the scientific investigation of such economic problems of great national importance that in Canada they are attacked by State institutions subsidised and supported by the State authorities, whilst in this country the work is left to private individuals and to private resources. Is it too much to hope that the attention of the Committee of the Privy Council for Scientific and Industrial Research may be directed to the admirable work done in Canada, and that it may decide that the time has at last arrived to initiate something of the kind in this country?

REV. O. PICKARD-CAMBRIDGE, F.R.S.

FEW, whatever their nationality, who have been especially interested in spiders during the last forty years have failed to make the pilgrimage to Bloxworth, where the Rev. O. Pickard-Cambridge, who died on March 9, had been rector since 1868, and to enjoy the delightfully informal hospitality of the Rectory. The famous "den" was no doubt their first objective, but those who were privileged to walk with their host in the surrounding country must have realised that they were in the company of a born naturalist of the widest sympathies, keenly observant, and on the friendliest terms with every living thing—beast, bird, insect, or plant—encountered by the way. There can have been few naturalists of equal calibre less revealed by their published work. This in his case was almost exclusively systematic, and was concerned for the most part with a single Arachnid order, the Araneina. It is true that he was selected to write the article "Arachnida" for the ninth edition of the "Encyclopædia Britannica" (1875); that he published useful little monographs on the British Phalangids and Pseudoscorpions (1890 and 1892); and that he occasionally described a tick or a Tartarid; but these were excursions, and through a long series of years his leisure was devoted mainly to the identification and description of spiders.

This most useful and necessary work does not stand very high in the estimation of some zoologists, though it is noticeable that a worker in some other field—a morphologist, for example—forced by stress of circumstances to try his own hand at identification, soon acquires an added respect for the necessary qualifications. In any case, it is on his work as a systematist that the reputation of Pickard-Cambridge is solidly based. His natural *flair* for minute points of difference, his facility as a draughtsman, his tireless patience, and his unflagging enthusiasm through a long series of years were his equipment for his self-imposed task. The mantle of John Blackwall fell upon him. He set himself to continue Blackwall's work, and to him he dedicated, in 1881, his most important book, "The Spiders of Dorset," "as a small token of long friendship and respect, as well as of gratitude for constant and ready assistance in the study of spiders during the last twenty-five years." This book (its title is altogether too modest) still remains essential to the student of British spiders, supplemented by the papers since annually published by its author in the Proceedings of the Dorset Field Club, and by his "List of British and Irish Spiders" (1900).

As regards exotic species, Mr. Pickard-Cambridge published brochures on spiders collected by himself in Palestine and Egypt (Proc. Zool. Soc., 1872–4–6), and on collections by members of his family, private friends, or scientific expeditions from various regions; but his chief work in this field was in connection with the "Biologia Centrali Americana." The task of dealing with the mass of material involved proved eventually beyond his powers, and failing health obliged him to hand it over to his nephew, the late Frederic O. Pickard-Cambridge, but he continued his work on the native Arachnid fauna until the end.

Many will miss the help he was always eager to give to those who applied to him for information or advice, and not a few will mourn the loss of a picturesque and interesting personality.

NOTES.

THE annual meeting of the British Association, arranged to be held at Bournemouth in September next, has been cancelled; and there will be no meeting, therefore, this year. The two main considerations which have led to this decision are the restriction of railway communication and difficulties of accommodation on account of buildings being required for various national purposes. There will probably be a meeting of the General Committee of the association in London to receive reports and transact other business.

IT is refreshing to note that some of the museums of this country, by making themselves of immediate use, are justifying the authorities who have kept them open. The Leicester Museum, which led off with the first public exhibition of mothercraft, is now seeking by means of models to aid those who find themselves handling a spade for the first time and have yet to learn that a potato has two ends. Norwich Museum, which also had its mothercraft show, has opened a thrift and economy exhibition. Food values, cheap cooking, home-washing, thrift garments, fuel economy, saving of man-power, and the cultivation of potatoes are among the subjects dealt with. It seems to us that the rate-supported museums are quite the proper instruments for the education of the public in these homely ways of helping the country, and we hope that more will follow the example of Leicester and Norwich.

Sir J. Wolfe Barry is to deliver the "James Forrest" lecture to the Institution of Civil Engineers on Wednesday, May 2, taking as his subject, "The Standardisation of Engineering Materials and its Influence on the Trade and Prosperity of the Country."

News has just reached us of the death on February 6, at sixty-three years of age, of Dr. H. F. E. Jungersen, professor of zoology in the University of Copenhagen and director of the department of vertebrates in the University museum.

The death is announced of Col. Walter Katte, the civil engineer who built the elevated railways of New York. He was born in London in 1830, and was educated at King's College School. He emigrated to America in 1849. At the outbreak of the Civil War he commanded an engineer regiment. He superintended the construction of the first steel-arch bridge to span the Mississippi.

Another national park has been set apart by vote of the American Congress. This new reservation has an area of 2200 square miles, and lies in south-central Alaska. It contains within its boundaries the highest mountain in America, Mount McKinley, and will consequently bear the name of the Mount McKinley National Park. As a game refuge and breeding-ground the park is expected to preserve Alaskan game, which elsewhere is rapidly disappearing.

The expedition which the American Museum of Natural History has maintained for the last six months in Nicaragua has returned to New York, bringing with it a collection of 1500 fishes and 2000 reptiles, together with a large series of photographs and unusually complete œcological notes. The material thus obtained is said to be of special value, as no specimens of reptiles have ever before been brought out of this region, although it has a reptile fauna of no ordinary interest, not only because of the great diversity in the topographical features, but also because the isthmus to-day forms a transition tract between the two continents, and is supposed in the past to have had land connection with Cuba and Jamaica. The expedition was in charge of Mr. C. R. Halter, an assistant in herpetology at the museum, and Mr. L. A. Mannhardt, of Yale.

We learn from the *Times* that it has been decided to introduce summer time this year, as recommended by the Home Office Committee, throughout the United Kingdom, beginning at 2 o'clock in the morning of Sunday, April 8, when the clocks will be put forward one hour, and ending at 2 o'clock in the morning of Monday, September 17. An Order in Council will be issued to give effect to this decision. The Rome correspondent of the *Times* announces that summer time will be adopted in Italy on April 1, and will remain in force until the end of September. Under the Daylight Saving Act, clocks in Australia were put back one hour on Sunday, March 25.

The annual general meeting of the Ray Society was held on March 22 in the apartments of the Geological Society, Dr. S. F. Harmer, in the absence of the president, being in the chair. The report of the council showed a slight increase in the membership, a large increase in the sale of publications, and a very satisfactory balance-sheet, and stated that two volumes had been issued for 1916, and the issue for 1917 would be the "British Characeæ" by Mr. James Groves and Canon Bullock-Webster. One of the rules was amended so as to require authors to agree to assign the copyright of their works to the society. Vacancies on the council were filled by the election of Sir David Prain and Dr. A. B. Rendle. Prof. W. C. McIntosh was re-elected president, Dr. F. Du Cane Godman treasurer, and Mr. John Hopkinson secretary.

The President of the Board of Trade has appointed a committee to consider and report what steps should be taken, whether by legislation or otherwise, to ensure that there shall be an adequate and economical supply of electric power for all classes of consumers in the United Kingdom, particularly industries which depend upon a cheap supply of power for their development. The members of the committee are:—Mr. F. Huth-Jackson (chairman), Mr H. Booth, Mr. J. Devonshire, Mr. J. Falconer, Mr. G. H. Hume, Mr. J. Kemp, Mr. H. H. Law, Mr. C. H. Merz, Sir Charles Parsons, Sir John Snell, Alderman C. F. Spencer, and Mr. A. J. Walter. The secretary of the committee is Mr. M. J. Collins, to whom all communications on the work of the committee should be addressed at the Board of Trade, 7 Whitehall Gardens, London, S.W.1.

The President of the Board of Agriculture and Fisheries has appointed a committee to consider practical means for increasing the supplies of sea-fish for the home markets and for encouraging the consumption of such fish, whether cured or fresh, in substitution for other foods. The committee has received a grant from the Development Fund, with authority to expend the grant, subject to limitations and conditions recommended by the Development Commissioners and approved by the Treasury, at their discretion for the increase of the fishing power of vessels other than steam fishing vessels. In general their expenditure will be confined to assisting fishermen who are owners of their own boats to develop their fishing power and to secure greater quantities of fish. The committee consists of:—Mr. Cecil Harmsworth (chairman); Mr. H. S. M. Blundell, of the Admiralty War Staff (Trade Division); Mr. H. G. Maurice, of the Board of Agriculture and Fisheries; Mr. E. H. Collingwood, of the Board of Agriculture and Fisheries; Mr. Stephen Reynolds, representing the Development Commissioners; Mr. A. Towle, representing the Food Controller. The secretary and manager is Mr. G. K. Hext. Communications should be addressed to the secretary, Fish Food Committee, 43 Parliament Street, S.W.1.

The President of the Board of Agriculture and Fisheries has appointed a committee to consider whether any considerable addition to the home food supplies of fish could be provided from the rivers, lakes, and ponds of England and Wales. The committee is requested to have special regard to considerations affecting the practicability of any scheme for bringing fresh-water fish supplies into consumption, such as the machinery and labour required to make the supplies available, facilities for their transport to market, the food value of the different kinds of fish, the probability of its proving acceptable to the consumer, the necessity for interference with private rights, and the risk of damage to more valuable fisheries. Further, the committee will consider and report upon measures which might be taken for securing a greater output of eels from the waters of the United Kingdom for home consumption. The members of the committee are:—Lord Desborough (chairman), Mr. R. B. Marston, Mr. A. R. Peart, Mr. F. G. Richmond, Mr. H. T. Sheringham, Mr. A. Tate Regan, Sir John Wrench Towse. The Hon. A. S. Northcote will act as secretary to the committee. All communications should be addressed to the secretary, Fresh-water Fish Committee, 43 Parliament Street, S.W.1.

MR. E. HERON-ALLEN devoted his recent address as president of the Royal Microscopical Society to an elaborate account of the career and observations of Alcide d'Orbigny, the founder of our knowledge of the Foraminifera (Journ. Roy. Microscop. Soc., 1917, part i.). Alcide's father, Charles d'Orbigny, a doctor at Esnandes, near La Rochelle, initiated the studies which made his son's name immortal. Félix Dujardin, moreover, in 1835, not ten years after the publication of d'Orbigny's "Tableau méthodique," first appreciated the simple nature of the foraminiferal organism, and removed the group, which he styled Rhizopoda, from any alliance with the Mollusca. But d'Orbigny's skill in minute observation, in collation, and in delineation makes a permanent claim upon our gratitude, and Mr. Heron-Allen proposes to publish, when peace returns, the remarkable series of "planches inédites" that he has brought once more to light in the museum at the Jardin des Plantes in Paris. Two coloured examples of these beautiful plates accompany the address, and the other illustrations add touches of human interest to what has become, in its author's hands, a genuine biographical and bibliographical research.

THE *Atti dei Lincei* (xxvi. (1) 1) contains an account of the work of Prof. Angelo Battelli, whose death, at the age of fifty-four, occurred on December 11 of last year. Born in 1862, Battelli entered the University of Turin at the close of his school career, and by 1884, when he graduated, he had already qualified for substantial researches in physics. His earliest interest was in thermo-electricity, in which he made the first determination of the so-called "specific heat" of electricity. The Peltier effect was the subject of repeated experiments, and he described an arrangement in which reversal took place at a moderate temperature. Later researches dealt with the effects of pressure on the temperature of fusion and that of magnetism on thermal conductivity, as well as on thermo-electric effects. In 1887 Battelli commenced an extended series of investigations on the critical point, the density of saturated vapours, and of liquids at the maximum vapour pressure, specific heats, and allied phenomena. In particular, he traced the isothermals in the neighbourhood of the critical point. In 1898 he gave his attention to the study of oscillatory discharges and the attendant phenomena. He was also the author of a number of books, including some text-books, besides works of a more substantial character, on electrolytic dissociation and radio-activity. On his appointment at Pisa, Battelli found the physical laboratory quite inadequate, both for instruction and for higher studies, and it became necessary for him to get it properly equipped. He also took an active part in educational discussions in the Italian Second Chamber. The author of the notice, Dr. A. Naccari, expresses the opinion that his end was accelerated by his constant activity, which he would not allow to flag even in his last sad illness.

THE twenty-sixth annual meeting of the Royal Society for the Protection of Birds was held at the Middlesex Guildhall on March 22, her Grace the Duchess of Portland, president, being in the chair. As might be supposed the war has adversely affected the work of the society, though not to any serious extent. It was mentioned that the large camps now scattered over the country have often, inevitably, invaded areas under the protection of the society. But the damage done, it is hoped, will be less than was feared, for in many cases the men were induced to take an interest in the birds, and thus reduced the damage to the lowest possible limits. The work of the society's watchers, all of whom are ineligible for military service, has for the most part gone on successfully, and some interesting items have been recorded. We are glad to note that the breeding season of 1916 was highly successful in the case of the Kentish and Norfolk plovers, chough, phalarope, peregrine falcon, and buzzard. The gannet nested for the first time on Noss, in the Shetlands; the redshank for the first time on one of the Cumberland lakes; while the great skua has spread to a new region. A strong expression of opinion that the recent prohibition of the importation of plumage during the war should find a permanent place on the Statute Book was warmly supported. For it was pointed out that otherwise the work of the plume-hunters would still go on, their ill-gotten gains being hoarded until after the war, when they would be dumped upon the market. The Dutch Committee for the Prohibition of the Exportation of Birds and Bird-skins from Dutch Colonies was very emphatic on this point. A number of valuable leaflets on the need for the protection of insectivorous birds has been issued by the society for distribution, and these should be widely read.

THE following are the lecture arrangements at the Royal Institution after Easter:—Prof. C. R. Beazley, two lectures: "Russian Development": (i) "The Old Free Russia," (ii) "The Rise of Moscow"; Prof. C. S. Sherrington, two lectures: (i) "Tetanus: Its Prevention, Symptoms, and Treatment," (ii) "Rhythmic Action in Muscle and in Nerve"; Prof. D'Arcy W. Thompson, two lectures: "Architectural Design in Organisms," "The Laws of Growth and Form"; Prof. W. W. Watts, two lectures: "The Flow of Ice and of Rock"; Prof. H. S. Foxwell, two lectures: "Industrial Finance after the War"; Prof. Gilbert Murray, two lectures: "Pagan Religion at the Time of the Coming of Christianity"; Prof. W. Bateson, two lectures: "The Chromosome Theory of Heredity and the Alternatives"; Alfred Noyes, two lectures: "Modern English Poetry"; Prof. G. H. Bryan, two lectures: "Principles of Aerial Navigation"; Sir J. J. Thomson, six lectures: "The Electrical Properties of Gases." The Friday evening discourses, which will begin on April 20, include:—Prof. R. H. Biffen, "The Future of Wheat-growing in England"; J. Dundas Grant, "The Organs of Hearing in Relation to War"; H. Wickham Steed, "Some Guarantees of Liberty"; Prof. John Joly, "Radio-active Haloes"; Prof. F. Soddy, "The Complexity of the Chemical Elements"; J. Barcroft, "Breathlessness"; J. H. Balfour Browne, "The Brontës: a Hundred Years After"; Sir J. J. Thomson, "Industrial Applications of Electrons."

"THE War and Our Supply of Drugs" was the subject of a paper read before the Royal Society of Arts recently by Mr. F. A. Hocking. Out of about eighty drugs of vegetable origin in use at the London Hospital during 1914, only a few are drugs ordinarily derived from enemy countries, the chief being aconite, belladonna, colchicum, digitalis, gentian, henbane, opium, and possibly valerian. After the outbreak of war the main difficulties were in respect of the supply of belladonna, henbane, and valerian. The needs are now being met partly by products grown in this country and partly by drugs obtainable from abroad. Thus India supplies opium, Japan aconite and valerian, and Egypt henbane Of the alkaloids and their salts, seven out of the fifteen used in the hospital were, and of course still are manufactured here on a large scale, both for home use and for export. The remainder were obtained from enemy countries. Of the acids and their salts, the majority are home products, but in some cases the raw materials, especially potassium and bromine, were either in enemy hands or under neutral control, with the result that their prices rose enormously The most important of manufactured organic drugs, such as ether, ethyl chloride, chloroform, iodoform, carbolic acid, glycerine, and alcohol, are produced here in large quantities; but most of the synthetic drugs, like aspirin, phenacetin, salvarsan, and veronal, were German products. Many of these articles, however, are now being made here. On the whole, for our drug supplies we are much less dependent upon enemy sources than has generally been recognised. The author, indeed, suggests that the necessity for the home cultivation of medicinal plants has perhaps been over-emphasised, since the demand for belladonna and digitalis is strictly limited.

IN No. 7, second series, of the Bankfield Museum Notes, Miss L. E. Start publishes a monograph on Burmese textiles from the Shan and Kachin districts, based on a collection of examples made by Mr. E. C. S. George, at the end of last century, whilst he was engaged on the Commission for the delimitation of the Burma-China boundary. The monograph is illustrated by an excellent collection of drawings showing the modes of dress and the forms of ornamentation used by the native weavers. The illustrations to some degree suffer from the absence of colour, but designers of fabrics, who can examine the original specimens in the Bankfield Museum, will be well advised not to neglect this important collection of Oriental art, which may enable them to follow some of these graceful designs, and prepare new schemes of decoration suitable to the native races of Burma.

MR. J. H. GURNEY makes grave charges against the rook and the wood-pigeon in *British Birds* for March. As to the former he remarks: "It has always seemed an anomaly to me that hawks in Norfolk, and even owls, should be persecuted, while rooks go almost unscathed, although there is not a farmer who has a good word to say for them." They eat potatoes and newly sown grain, riddle the cornstacks with holes and thus admit the rain, and destroy a large quantity of swede turnips. The wood-pigeons levy a heavy toll on the thousand-headed kale and on the pea-fields. The starling, in Norfolk, is tolerated on account of its usefulness in destroying the white slugs, which infest the clover-fields.

INTERESTING "Observations on Some Habits of the Coot" are described in the *Scottish Naturalist* for March. These more especially refer to the behaviour during courtship. At this time the white shield, so conspicuous a feature of this bird, enlarges so as to project on each side of the crown. But the author leaves the reader in some doubt as to whether this is a permanent increase during the breeding season or whether it is an inflation evident only during moments of excitement, comparable to the distension and contraction of the wattle of the turkey-cock in similar circumstances The adults were found to be still feeding their offspring two months after hatching, and therefore long after they had become fully fledged. During October the male frequently gave the "spring call," and the pair frequently repeated the behaviour characteristic of the spring courtship, as many game-birds are known to do.

A VALUABLE contribution to our knowledge of the genetics and evolution of an interesting group of Lepidoptera is given by J. W. H. Harrison in a recent paper entitled "Studies in the Hybrid Bistoninæ" (*Journal of Genetics*, vol. vi., No. 2). The species with which he has worked are the common British moth (*Biston hirtaria*), the well-known local sandhill-haunting *Nyssia zonaria*, whose female is wingless, and four species of the northern genus Poecilopsis, one of which, *P. lapponaria*, is a rarity in Scotland. The Biston males, if successfully crossed with the wingless females give winged males, and females with reduced wings, and closely similar results followed the pairing of *P. pomonaria* males with *Biston hirtaria* females. Hence, "as regards potency in transmitting the secondary female character of wing-reduction, *pomonaria* males and females are alike." Two of these male *hirtaria-pomonaria* hybrids were successfully crossed with *hirtaria* females. With one exception, all the offspring were indistinguishable from *hirtaria*, a result explained by the production of "a few functionally active spermatozoa carrying to all intents and purposes *hirtaria* characters, with hosts of spermatozoa carrying a varied array of novel chromosome combinations, all possibly ineffective." However, there was a single intermediate specimen which "lacked the sexual instincts and was unable to walk or to fly." Mr. Harrison notes that the North American *Poecilopsis rachelae*, when crossed with the European species, gives a very small proportion of fertile eggs and concludes that "geographical separation caused the physiological condition of the species to diverge enormously."

VARIOUS schemes for the promotion of afforestation in Scotland, by co-operation between the landowners and the State, are discussed in three articles in Transactions Roy. Scottish Arboricultural Society, xxxi., part i. (January, 1917). The Development Commissioners, who have lately forwarded their proposals for afforestation and land reclamation to the Reconstruction Committee, do not favour the purchase of land by the Government, but recommend that it should be taken on lease, the landowner to receive, in addition to a rent, a bonus or percentage on the profits of the undertaking. Mr. S. Gammell advocates a scheme of planting by the landowner, who would receive from the State a loan for this purpose, to be repaid, after the lapse of a period of forty years, in twenty annual instalments, calculated on compound interest at 2½ per cent. Mr. James W. Munro gives an illustrated account of the life-history of *Hylastes cunicularius*, a beetle which destroys recently planted conifers by girdling the bark just below the root-collar.

THE *Revue Scientifique* of March 3 contains an article by Prof. Henri Devaux, of Bordeaux, in which the attention of French wheat-growers is directed to the excellent results obtained by him with special methods of cultivation of wheat which are said to be widely and successfully practised in Russia. The two methods singled out for special commendation are the planting out of selected plants from a seed-bed, and the cultivation of the wheat in wide rows, permitting of an earthing-up of the plants at a later stage. It is claimed that by either method a very much larger individual plant can be obtained, and the total produce of a given area greatly increased. Full details for practical cultivation on these lines are given, and the article is illustrated by photographs of specimen plants.

These methods have previously been advocated in this country, and are worthy of investigation, but the obvious increased demand for labour as compared with ordinary methods of cultivation must render them largely impracticable for adoption under present conditions.

THE *Irish Naturalist* for March contains the annual report of the Royal Zoological Society, from which it is clear that the society has passed through a very troublous year, and one which came dangerously near to disaster. During the week of the Easter rebellion the difficulty of conveying food for the larger carnivores to the gardens was so great that some of the less valuable stock had to be sacrificed, including "an old pony, a donkey, a goat, and a few dingoes." These had to go to feed the lions and tigers. The keepers, for the time, had to be housed in the gardens owing to the danger of venturing into the streets of Dublin. Further, owing to the social unrest, the receipts for the month practically ceased. This loss, with the falling off of revenue owing to resignation of subscribers, has seriously crippled the society, but, fortunately, thanks to the generosity of some of its members, the deficit at the end of the year was much less than at one time seemed inevitable. The young female gorilla, we are glad to notice, is not only still alive, but is, further, in better health than was the case when the report for 1915 was issued. During midsummer a female bison calf was born and is still thriving. For the first few weeks it was of a bright red colour, but has now assumed the typical dark coat.

THE plans of a projected aerial expedition to New Guinea by Dr. Eric Mjöberg, of Stockholm, are outlined in the February issue of the *Geographical Review* (vol. iii., No. 2). In view of the great difficulties presented by climate and vegetation in reaching the mountains of the interior, Dr. Mjöberg proposes to use aeroplanes or even hydroplanes. He considers that the interior will afford four different possibilities of landing: alpine meadows at 12,000–13,000 ft., open or thin savannas at lower altitudes, steppes of *alang* grass known to occur here and there, and lake surfaces. These last are not certain to occur. A reconnaissance is first to be made with a light machine. Then a heavier machine capable of carrying five passengers and stores is to leave the base for the interior. Subsequent communication would be maintained between the coast and the interior stations of the expedition in a few hours' time. Dr. Mjöberg proposes to take with him two surveyors, a botanist, a zoologist, and a geologist, besides several expert airmen.

THE annual report of the Weather Bureau of the Manila Observatory for 1915 has been published. It contains the full hourly meteorological observations made throughout the year. In addition to the central observatory at Manila, the Weather Bureau maintained fifty-six other stations throughout the Philippines, and one at Yap, in the western Carolines. There seems, however, to be some doubt whether the station at Yap has been maintained in working order since the change in ownership of the Carolines. The lack of communication with Yap interfered with the typhoon warnings sent out by the Manila Observatory. The volume directs attention to the fact that the Manila Observatory has now been in existence for fifty years.

MESSRS. KODAK, LTD., have just issued an illustrated booklet on "Kodak Bromide Pictures, by Some who Make Them," a collection of seven articles, supplemented by the firm's own instructions. Though obviously of chief interest to those who use bromide papers for pictorial purposes, there are suggestions that may be of much wider utility, and the illustrations show what a great range of possibilities is offered by this method of printing. The scientific worker will need, however, to add to these the results obtainable on papers that have a glossy surface, which emphasises feeble and minute details, and will note the "transferotype" paper which permits of the film that bears the image being transferred to surfaces such as those of glass, porcelain, wood, metal, canvas, etc.

CERTAIN species of lichens have long been used by the inhabitants of Ireland, Scotland, and other parts of Northern Europe for dyeing wool various shades of yellow or reddish-brown. Four of these lichens, *Parmelia saxatilis,* Ach., *Ramalina scopulorum,* Ach., *Ramalina cuspidata,* Nyl., and *Physcia parietina,* De Not., have been examined by Dr. Hugh Ryan and Mr. W. M. O'Riordan (Proceedings of the Royal Irish Academy, 1917, xxiii., Section B, pp. 91–104) with the view of isolating their tinctorial constituents. The first three lichens were submitted to a preliminary extraction with ether. By this means a colourless, crystalline substance was obtained from *Parmelia saxatilis,* probably identical with Zopf's stereocaulic acid, whilst *Ramalina scopulorum* and *R. cuspidata* gave Zopf's *d*-usnic acid. After the treatment with ether the three lichens were extracted with boiling acetone. By this means a colourless, crystalline substance, apparently identical with Zopf's salazinic acid, was obtained from *Parmelia saxatilis.* The lichen *Ramalina scopulorum* gave a white, microcrystalline substance probably identical with Zopf's scopuloric acid, whilst *R. cuspidata* also yielded a white, crystalline substance, which, however, was not identified with any known compound. That these three substances are the tinctorial constituents of the respective lichens is shown by the fact that when wool is boiled with water containing them it is dyed in a manner similar to that produced by the lichens. *Physcia parietina* when extracted with chloroform gave a quantity of physcione (probably identical with frangula-emodin-monomethylether), which has little or no dyeing properties, but which when demethylated gives frangula-emodin. The latter dyes unmordanted wool a dull orange-yellow colour.

A USEFUL catalogue (No. 67, March) of books of science (many of them scarce) has been issued by Messrs. Dulau and Co., Ltd., Soho Square, W.1, which should appeal to many of our readers. It is arranged conveniently under the headings Botany and Horticulture, Geology and Palæontology, Entomology (with subdivisions), Ichthyology, Mammalia, Mollusca and Conchology, Ornithology, Reptilia and Batrachia, and Scientific Voyages and General Zoology.

OUR ASTRONOMICAL COLUMN.

THE SPECTRUM OF N.G.C. 7023.—Dr. Max Wolf has previously pointed out that many nebulæ in the Milky Way are encircled by a nearly circular space which is void of faint stars, and that this lacuna is usually situated at the end of a long, starless channel. Such nebulæ are designated "Höhlennebel," or "cave-nebulæ," and Dr. Wolf has recently given an account of spectroscopic observations of some of them which have been made at Heidelberg (*Ast. Nach.*, No. 4875). One of the finest examples is H. IV. 74 Cephei (N.G.C. 7023), in which the cave has a diameter of nearly half a degree, and the nebula surrounds the star B.D. + 67° 1283, of magnitude 6·8. The photographs show that the star is of type A, and that the spectrum of the nebula exactly resembles it, without showing any trace of the lines characteristic of gaseous nebulæ. It